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Sertifikaat

PATENTKANTOOR  
REPUBLIC OF SOUTH AFRICA

DEPARTEMENT VAN  
HANDEL EN NYWERHEID



ET/ZA02/00172

REPUBLIC VAN SUID-AFRIKA

#2  
Certificate

PATENT OFFICE

DEPARTMENT OF TRADE  
AND INDUSTRY

Hiermee word gesertifiseer dat  
This is to certify that

REC'D 01 APR 2003

WIPO PCT

The documents annexed hereto are true copies of:

Application forms P1, P2 and provisional specification and drawings  
of South African Patent Application No. 2002/0416 as originally  
filed in the Republic of South Africa on 17 January 2002 in the name  
of MARCUS, STANLEY for an invention entitled: "REPELLENT  
APPARATUS AND METHOD".

Geteken te  
Signed at

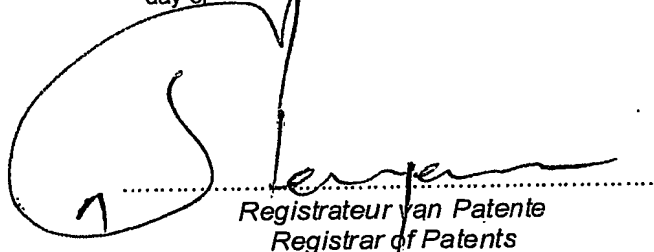
PRETORIA

in die Republiek van Suid-Afrika, hierdie  
in the Republic of South Africa, this

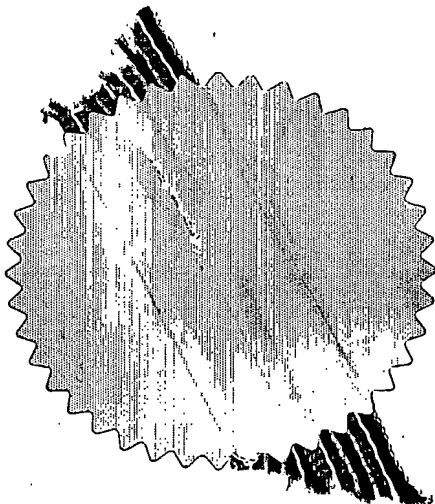
12th

dag van  
day of

March 2003

  
Registrateur van Patente  
Registrar of Patents

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REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

## REGISTRAR OF PATENTS

Official Application No.		Lodging date: Provisional		Acceptance date:			
21	01	22	17 JANUARY 2002	47			
International Classification		Lodging date: Complete		Granted date:			
51		23					
Full name(s) of applicant(s)/Patentee(s)							
71	MARCUS, Stanley						
Applicant(s) substituted:				Date Registered:			
71							
Assignee(s):				Date Registered:			
71							
Full name(s) of inventor(s)							
72	MARCUS, Stanley						
Priority claimed		Country		Number		Date	
Note:		33	NONE	31	NONE	32	NONE
Use International		33		31		32	
Abbreviation for Country		33		31		32	
Title of Invention:							
54	REPELLENT APPARATUS AND METHOD						
Address of applicant(s)/patentee(s)							
37B East Road, Morningside, Sandton							
Address for Service:							
74	McCALLUM, RADEMEYER & FREIMOND, Maclyn House, June Avenue, Bordeaux, Randburg • P.O. Box 1130, Randburg 2125						
Patent of Addition No.				Date of any change:			
61							
Fresh Application based on:				Date of any change:			

**REPUBLIC OF SOUTH AFRICA  
PATENTS ACT, 1978**

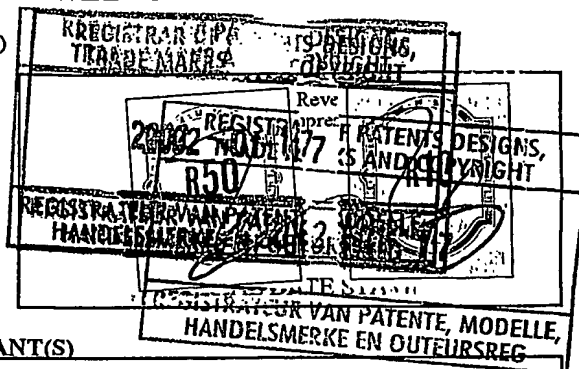
**APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF  
RECEIPT**

(Section 30(1) - Regulation 22)

The grant of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate

**OFFICIAL APPLICATION NO.**

21	01	2002/0416
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**FULL NAME(S) OF APPLICANT(S)**

71	MARCUS, Stanley
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**ADDRESS(ES) OF APPLICANT(S)**

37B East Road, Morningside, Sandton
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**TITLE OF INVENTION**

54	REPELLENT APPARATUS AND METHOD
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Priority is claimed as set out on the accompanying Form P2.

The earliest priority claimed is :

This application is a patent of addition to Patent Application No.	21	01	
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This application is a fresh application in terms of section 37 and based on Application No.	21	01	
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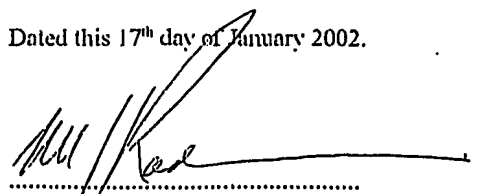
**THIS APPLICATION IS ACCOMPANIED BY:**

<input checked="" type="checkbox"/>	1	A single copy of a provisional specification of 10 pages
<input type="checkbox"/>	2	Two copies of a complete specification of ..... pages
<input checked="" type="checkbox"/>	3	2 sheets of Informal Drawings
<input type="checkbox"/>	4	..... sheets of Formal Drawings
<input type="checkbox"/>	5	Publication particulars and abstract (Form P8 in duplicate)
<input type="checkbox"/>	6	A copy of Figure ..... of drawings (if any) for the abstract
<input type="checkbox"/>	7	Assignment of Invention
<input type="checkbox"/>	8	Certified priority document(s) Number(s)
<input type="checkbox"/>	9	Translation of priority document(s)
<input type="checkbox"/>	10	An assignment of priority rights
<input type="checkbox"/>	11	A copy of the Form P2 and the specification of SA Patent Application No.
<input checked="" type="checkbox"/>	12	A declaration and power of attorney on Form P3
<input type="checkbox"/>	13	Request for ante-dating on Form P4
<input type="checkbox"/>	14	Request for classification on Form P9
<input checked="" type="checkbox"/>	15	Form P2 in duplicate

21	01	
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74	ADDRESS FOR SERVICE: McCALLUM, RADEMEYER & FREIMOND, Maclyn House, June Avenue, Bordeaux P.O. Box 1130, Randburg, 2125
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Dated this 17<sup>th</sup> day of January 2002.

  
 .....  
**McCALLUM, RADEMEYER & FREIMOND**  
**PATENT AGENTS FOR APPLICANT(S)**

<b>REGISTRAR OF PATENTS, DESIGNS, TRADE MARKS AND COPYRIGHT</b>  <b>2002 -01- 17</b>  <b>REGISTRATEUR VAN PATENTE, MODELLE, HANDELSMERKE EN OUTEURSREG</b>
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REPUBLIC OF SOUTH AFRICA  
PATENTS ACT, 1978

PROVISIONAL SPECIFICATION  
(Section 30(1) - Regulation 27)

OFFICIAL APPLICATION NO

LODGING DATE

21	01	2002/0416
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22	17 JANUARY 2002
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FULL NAME(S) OF APPLICANT(S)

71	MARCUS, Stanley
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FULL NAME(S) OF INVENTOR(S)

72	MARCUS, Stanley
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TITLE OF INVENTION

54	REPELLENT APPARATUS AND METHOD
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## BACKGROUND OF THE INVENTION

This invention relates to a method of and apparatus for repelling animals from a given area.

The invention is described hereinafter with particular reference to repelling birds from an area such as an airport, eg. alongside a runway at the airport, but the scope of the invention is not confined to this particular application which is given by way of example only.

The presence of birds at an airport constitutes a significant safety hazard to aircraft which are landing at, or taking off from, the airport. A typical airport extends over a substantial area and can have a large number of runways laid out in different directions over the area. Vegetation, typically grass, is established or naturally grows on the surfaces between runways. This vegetation can play host to a variety of animals and, in particular, to birds which, with the passage of time, can establish themselves and form large colonies.

If an aircraft which is landing or taking off at a runway collides with a bird or a flock of birds, or draws one or more birds into its air intake to one of its engines, the consequences can be disastrous.

Much effort has been expended in attempts to repel birds from an airport and, more particularly, from the ground adjacent runways. Diverse techniques exist including noise generators, scarecrows, ultrasonic transmitters, electrical

devices which apply mild electric shocks, electrically operated scarecrows and the like. It has been found that although these devices may, at least initially, be effective they are often not effective against all bird species but, more importantly, with the passage of time habituation lessens the effectiveness of the devices. Habituation is the waning of responsiveness to a deterrent which occurs when birds learn that the deterrent, as a matter of fact, does not present danger.

Although it may be possible to control bird populations by killing the birds this may be undesirable from an environmental point of view. This approach can also lead to a public outcry.

#### SUMMARY OF INVENTION

The invention provides in the first instance a method of repelling animals from an area which includes the step of causing at least one device to move, at least within part of the area, by means of a pressurised fluid.

The device may be caused to move substantially randomly, or in a predetermined manner.

The time at which the device is caused to be moved may be varied, according to requirement.

The pressurised fluid may comprise any suitable pressurised fluid and for example may comprise compressed air.

One or more substances may be entrained in the pressurised fluid. The substance could for example be selected from the following: water, sand, mud and the like. The invention is not limited in this regard.

5 The device may be flexible and may be caused to move with a whip action due to the pressurised fluid which flows through the device.

The pressurised fluid may be allowed to escape from the device through one or more nozzles which may be shaped to cause a reaction force which helps to cause movement of the device.

The device may be caused to rotate around an axis.

10 The invention also provides apparatus for repelling animals from an area which includes a device with an inlet which is adapted to be connected to a source of pressurised fluid and which is constructed so that it is movable by application of the pressurised fluid to the inlet.

The pressurised fluid is preferably compressed air.

15 The device may include a tube. The tube may be elongate. The tube may include one or more outlet nozzles through which pressurised fluid escapes from the tube. These nozzles may be oriented to assist in causing movement of the tube.

Alternatively, in the case in which the tube is flexible, the tube may be caused to move, substantially in a random manner, by the flow of compressed air through the tube.

Means may be provided for entraining a substance into the flow of pressurised fluid through the tube. The substance may be sand, water, mud or the like.

In one form of the invention the device is caused to rotate around a fixed axis.

The device may be elevated, at least to a limited extent, upon application of the pressurised fluid to the inlet and it may be allowed, to settle, under gravity or other action, to an inoperative position when the pressurised fluid is not applied to the inlet.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention is further described by way of examples with reference to the accompanying drawings in which:

Figure 1 is a schematic plan view of an airfield in which the method of the invention is used for repelling birds from areas adjacent runways at the airfield; and

Figures 2, 3 and 4 respectively illustrate different devices which are usable in the method of the invention.



## DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 of the accompanying drawings illustrates in plan an airfield 10 which includes a plurality of runways 12. Only one runway is shown in the drawing and it is to be understood that other runways at the airfield are treated in substantially the same way as what is described hereinafter.

The runway 12 is normally formed from concrete or a similar hardwearing surface. An aircraft 14 may traverse the runway in either direction. These aspects are known in the art and are not further described herein.

Ground 16 adjacent the runway 12, comprises bare earth over which vegetation, not shown, is established. Typically this vegetation comprises one or more varieties of grass, as has been described hereinbefore. The vegetation may play host to one more species of birds or other animals and these animals could present a safety hazard to the aircraft 14.

Main pipelines 18 are buried in the ground, on each side of the runway 12, at a suitable depth. At intervals along the length of each line 18 a riser tube 20 is connected to the line. Each tube terminates in a housing 22 which contains a connector and a solenoid valve. A flexible tube 24 is fixed to the connector and extends in a random manner from the connector. The tube 24 has a length which ensures that it cannot overlay a portion of the runway 12.

A compressed air source 26 is connected to the main line 18. Depending on the situation the compressed air source may comprise a large pressure vessel

or a dedicated air compressor. If appropriate use can be made of both devices. An intention in this regard is that the compressed air source should work at a controlled pressure and supply sufficient compressed air to the line 18 to activate one or more of the hoses 24 in a manner which is described hereinafter.

The compressed air source is under the control of a control unit 28. The various solenoid valves at each riser tube 20 are connected by means of lines 30 to the control unit 28.

Figure 2 illustrates one of the flexible tubes 24. The tube is coupled to a connector 32 which is fixed to the corresponding housing 22 in which is installed a solenoid valve 34. The riser tube 20 extends from the main line 18 which, as noted, is buried in the ground at a desired depth 36.

If compressed air, designated by means of an arrow 40, is applied to the main line 18, from the source 26, and the solenoid valve 34 is opened then the compressed air flows through the flexible hose 24. Depending on the pressure and the characteristics of the hose the flow of air, through the hose, can cause the hose to move with a whip action in a substantially random manner. If the ground 16 adjacent the runway 12 is to be cleared of animals and, in particular, birds, then the compressed air 40 is applied to the various hoses 24 in a manner which is determined by a program in the control unit 28 which causes the corresponding solenoid valves 34 to open and close as required. The hoses can be caused to move in a fairly vigorous manner

which is not predictable and the sequence in which the hoses are activated can also be varied in a non-predictable manner. Birds in the vegetation adjacent the runway are thereby repelled and the area adjacent the runway is free of bird life. The safety of the aircraft 14 is therefore considerably enhanced.

The repelling apparatus of the invention can be operated at different intervals, on an ongoing basis, or it can be operated before an aircraft takes off from, or lands on, the runway 12. Some degree of experimentation may be required in order to ascertain the most effective way, under the circumstances, of making use of the invention.

Figure 2 illustrates a vessel 42 with an outlet conduit 44 which is connected to the line 18. The vessel may contain water, sand, mud 46 or any other appropriate substance. When air flows through the main line 18 a portion of the substance in the vessel is entrained into the air flow and is distributed through an outlet end 48 of the flexible hose 24. If the substance 46 is, for example, sand then the sand is ejected from the end 48 at high speed, depending on the velocity of the escaping air, and this can add to the deterrent effect of the hose which is flexing to and fro.

Figure 3 illustrates a variation which can be incorporated in the apparatus shown in Figure 1. Inflatable scarecrows 50 are connected to the line 18 at regular intervals. The scarecrows can be inflated by the compressed air and when this happens each scarecrow, which is initially in a collapsed state, is

caused to move to an erect position in a short time. The sudden movement can assist in repelling birds from a given area. The inflation of each scarecrow is controlled by means of the control unit 28 which is connected via a control line 30 to a solenoid valve 34 which controls the flow of air from the line 18 to the scarecrow figure.

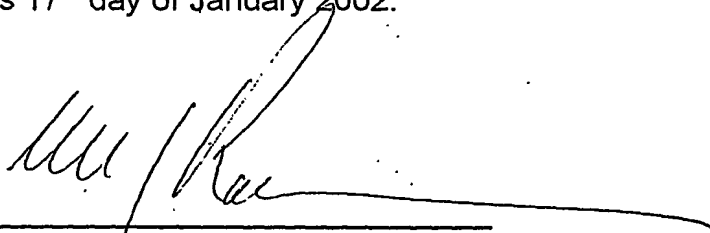
Figure 4 illustrates a further variation of the invention. Each housing 22 is formed in the nature of a "pop-up" device 60 similar to a pop-up sprinkler used in an irrigation system. Thus the housing includes a tubular body 62 which contains a swivel connector 64 which is mounted to a riser tube 20 in sliding fashion. When compressed air is applied to the swivel connector the resulting force causes the swivel connector to rise along the length of the tube 20 and the corresponding end of the hose 24 which is coupled to the connector is elevated. When the supply of compressed air is disconnected from the swivel connector air escapes from the swivel connector which then settles under gravity action, into the tubular casing 62. This arrangement has a number of benefits. Firstly it allows the tube 24 to be elevated when air is applied to it. The degree of elevation can be controlled so that the tube is lifted above the grass which may be growing on the ground 16 adjacent the runway. Secondly when the device is not being used it settles into the ground and thus does not present any obstruction to traffic over the ground 16.

A further modification is shown in Figure 4. The tube 24 which may be highly flexible or substantially rigid has one or more nozzles 66 at its outlet end 48. These nozzles are shaped so that air escaping from the nozzles exerts a

reaction force on the tube 24 which causes it to rotate about the swivel connector 64 as is indicated by means of a curved arrow 68. The tube can be caused to rotate fairly rapidly and vigorously so that birds adjacent the tube are repelled from the vicinity of the tube.

5 It is to be understood that the apparatus of the invention is not intended to cause injury to birds but, instead, is designed to make conditions adjacent the runway unacceptable to bird life. As the hoses move vigorously it is possible, however for the hoses to cause injury to birds. This can be a positive factor  
10 though, for a learning process sets in. The birds associate the moving hoses with danger and are therefore likely to fly away from the areas in which the hoses are installed and used.

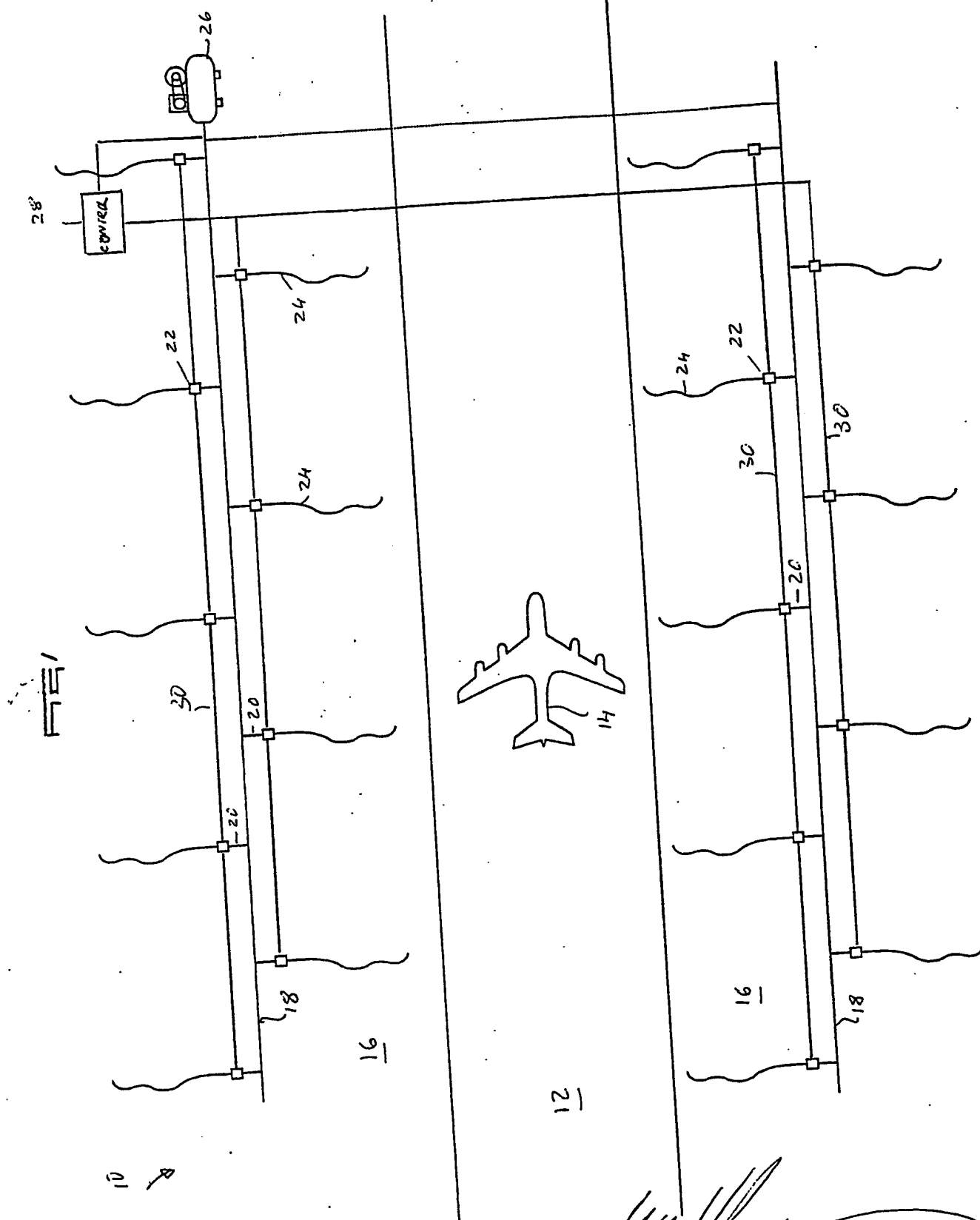
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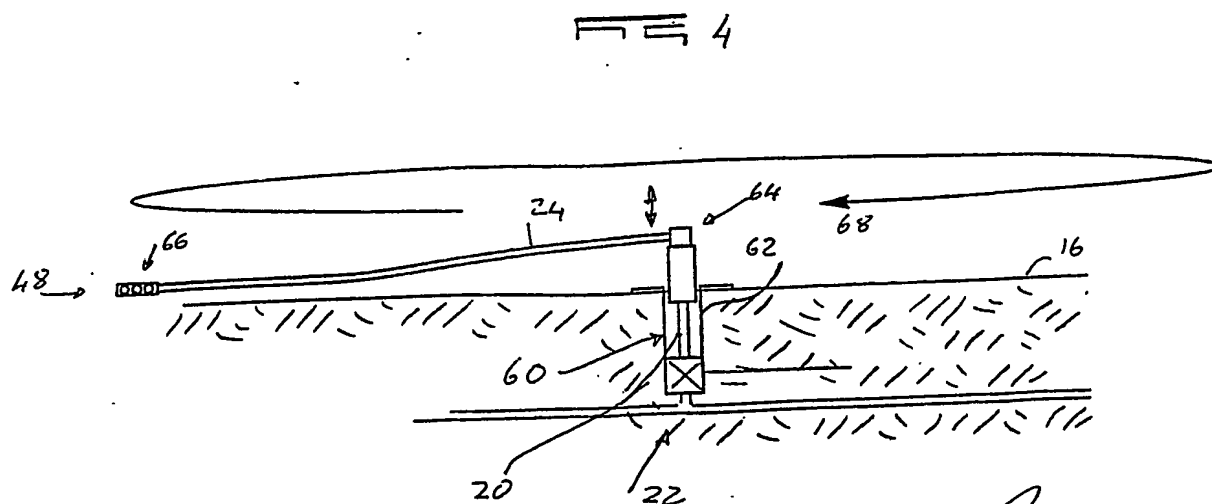
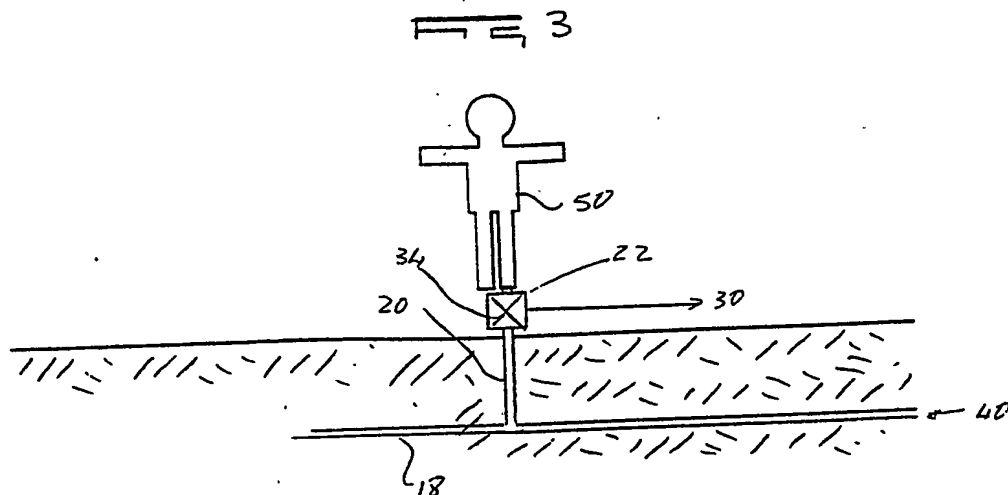
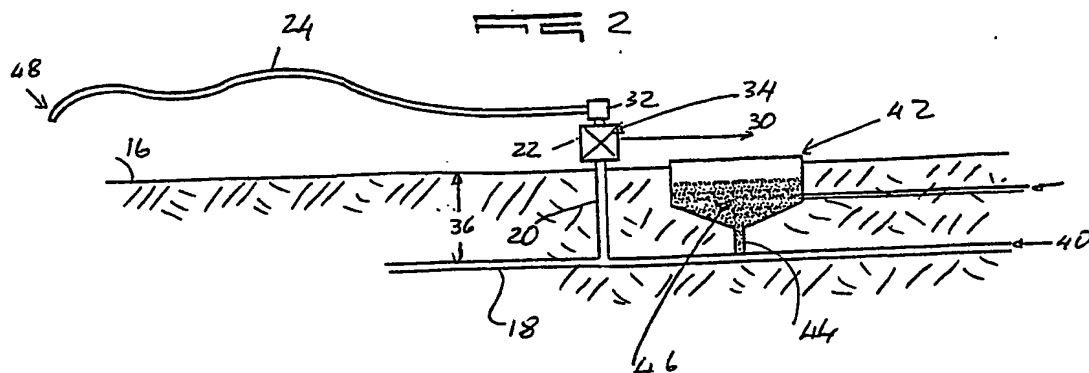
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Patent Agents for the Applicant

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